TECHNOLOGY NEEDS/OPPORTUNITIES STATEMENT

LONG TERM GAS GENERATION SURVEILLANCE

Identification No.: RL-NM-00-006
Date: September 2000

Program: Nuclear Materials Stabilization
OPS Office/Site: Richland Operations Office/Hanford Site
PBS No.: RL-CP03
Waste Stream: N/A
TSD Title: N/A
Operable Unit (if applicable): N/A
Waste Management Unit (if applicable): N/A
Facility: Plutonium Finishing Plant

Priority Rating:

This entry addresses the "Accelerated Cleanup: Paths to Closure (ACPC)" Priority:

____ 1. Critical to the success of the ACPC
_X_ 2. Provides substantial benefit to ACPC projects (e.g., moderate to high lifecycle cost savings or risk reduction, increased likelihood of compliance, increased assurance to avoid schedule delays)
____ 3. Provides opportunities for significant, but lower cost savings or risk reduction, and may reduce uncertainty in ACPC project success.

Need Title: Long term gas generation surveillance.

Need/Opportunity Category: *Technology Opportunity*

Need Description:

- Description: Thermally stabilized plutonium bearing materials are to be stored in 3013 containers for long periods of time awaiting final disposition by the Materials Disposition program. During storage, the DOE-STD 3013 standard requires that the containers be monitored for adverse conditions. A specific requirement is that the pressurization of the inner container be monitored. Current plans are to obtain baseline digital radiography of the container lid deflection to satisfy 3013 Standard requirements, and then use a magnetically coupled pressure gage and a radio frequency transmittal system to monitor for pressure changes.
- Background: The monitoring of DOE-STD 3013 containers for pressure buildup is important to assure safety of the storage facility, and to ascertain the container behavior when opened at the Material Disposition program processing facility. While a system to monitor the

containers via digital radiography has been developed, an alternative that requires less handling and more frequent data is desirable. The magnetically coupled pressure gage/RF transmitter system provides a significant portion of the desired attributes, but there is a potential to obtain other data from internal sensors and transmit it to monitoring equipment. Possible parameters of interest are gas composition, corrosive atmosphere behavior, and radiation spectrums.

- Improved pressure measurement technology will be used at the PFP and potentially at other DOE Sites, and other improvements in surveillance of container characteristics would also be likely to have wide spread applicability.

Schedule Requirements: The technology should be available as soon as possible to support the ongoing operations on 3013 containers in the 234-5Z building and subsequent vault storage. The installation of surveillance instrumentation into the 3013 containers on either a sample basis (representing various populations) or in each container would be decided based on cost and availability of the technology.

Earliest Date Required: Now
Latest Date Required: Completion of 3013 container welding occurs in FY 2004.

Problem Description: See above.

Potential Life-Cycle Cost Savings of Need (in $000s) and Cost Savings Explanation: Cost savings are difficult to project, as the long term surveillance requirements for the DOE-STD 3013 containers have not yet been fully defined. However, if the technology provided enough information on a real time basis to substitute or decrease the frequency of destructive analysis currently envisioned, a large cost savings could be achieved, on the order of $0.5 million dollars per year for at least 10 years.

Benefit to the Project Baseline of Filling Need: Reduced handling of stored containers for surveillance purposes could result in less dose to operators. A technology that provides remote sensing capability might also be useful for other remote information monitoring that could contribute to safeguards and security functions.

Relevant PBS Milestone: TRP-05-500 Complete stabilizing and packaging oxides > 30wt%

Functional Performance Requirements: Pressurization of the inner container head space of more than about 10 psi, up to pressures above 600 psi, must be measured and reported. The long-term performance of the container system is also of interest, in terms of corrosive behavior and internal system conditions during storage and shipping. Any technology proposed must be compatible with vault storage configurations and long-term storage radiation doses. The technology must consider the 3013 standard requirements for little or no organic allowed in the inner container, and other qualifications that might be required if the container design was affected.

Work Breakdown Structure (WBS) No.: 1.04.05.01.13

TIP No.: N/A

Justification For Need:

Technical: The ability to measure the container pressure and provide for monitoring and surveillance during long-term storage is required by the 3013 standard.

Regulatory: None.

Environmental Safety & Health: Dose reduction incurred for destructive or intrusive surveillances could be avoided.

Cultural/Stakeholder Concerns: None

Other: N/A

Current Baseline Technology: N/A

End-User: Fluor Hanford, Inc., Nuclear Materials Stabilization Project

Contractor Facility/Project Manager: George W. Jackson, Director, Nuclear Materials Stabilization Project, Fluor Hanford, Inc. (509) 373-6622

Site Technical Points-of-Contact: M. W. Gibson, Fluor Hanford, Inc. (FH), (509) 373-4869, Fax (509) 372-0232, email mark_w_Gibson@rl.gov

DOE End-User/Representative Point-of-Contact: Dave J. Sherwood, DOE-RL Material Disposition Division (509) 376-0038, Fax (509) 376-0695